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Chromosome Numbers in *Sanguisorba albiflora* (Makino) Makino (Rosaceae)

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Chromosome numbers were determined for 70 plants of *Sanguisorba albiflora*, endemic to subalpine areas of Tohoku district, Japan. This species was found to consist two cytotypes, octaploid (2n=56) and dodecaploid (2n=84). The two cytotypes have different distribution ranges, which overlap at Mount Gassan only. A hyperdodecaploid with 2n=85 was rarely found in a dodecaploid population.

In *Sanguisorba* (Rosaceae), polyploid series based on x=7 (2n=14, 28, 42, 56, and 84) and intraspecific polyploidy are known (Buttler 1983, Larsen 1959, Löve 1969, Mishima et al. 1996, Nakajima 1936, Natarajan 1977, 1978, Nishikawa 1978, Nordborg 1963, 1966, Oginuma 1990, Sakai 1935). *Sanguisorba albiflora* (Makino) Makino is endemic to Japan and distributed in subalpine regions of Tohoku district, northern Honshu. In this species, two different chromosome counts have been reported: 2n=56 (Nordborg 1966) and 2n=54 (Matsuura and Suto 1935). Nordborg (1966), however, did not mention the localities of material examined and number of plants examined. The latter number, based on a single plant, is unusual from the basic chromosome number x=7 in this genus.

This study was carried out to reveal variation of chromosome numbers in *S. albiflora* throughout its distribution range.

Materials and Methods

Seventy plants from 16 populations of *S. albiflora* were collected for examination (Table 1). The rhizomes were grown in pots at the experimental field of Toyama University and Tokyo Metropolitan University. For the observation of chromosomes, the root tips were pretreated in 0.002M 8-hydroxyquinoline for 1 hour at room temperature, and then 15 hour at 4°C. Fixation was carried out in Carnoy's solution (acetic acid : ethanol = 1 : 3) for 1 hour at room temperature. After 1N HCl-treatment for 1 hour at room temperature, the tips were macerated in 1N HCl for 11.5 minutes at 60°C. The root tips were rinsed in tap water for a few minutes, and squashed after staining with lacto propionic orcein.

Results and Discussion

Fifty nine plants of 14 populations were octaploid (2n=56, Fig. 1A), in accordance with the report of Nordborg (1966). On the other hand, 10 plants from three localities were dodecaploid (2n=84, Fig. 1B), which is the first record of this species. The octaploid and dodecaploid populations are isolated from each other, excepting Mount Gassan. At Gassan, both octaploid and dodecaploid plants

Table 1. The collection localities of *Sanguisorba albiflora* (Makino) Makino. Number of plants observed are shown in parentheses

Collection localities	2n	Altitude (m)	Collection numbers
1 Mt. Hachimantai, Tazawako-machi, Akita Pref.	56 (4)	1000	920928-A, -D, 930816-A, -B
2 Mt. Mokko-dake, Tazawako-machi, Akita Pref.	56 (5)	1400	920928-B, -C, -E, -F, -G
3 Mt. Iwate-san, Shizukuishi-machi, Iwate Pref.*	56 (3)	—	940725-C2, -C3, C4
4 Mt. Nyuto-san, Tazawako-machi, Akita Pref.	56 (3)	1240–1400	920830-F1, -F2, -F3
5 Mt. Komaga-take, Tazawako-machi, Akita Pref.	56 (4)	1200–1350	920819-A, -B, -C, 920823
6 Mt. Oname-dake, Tazawako-machi, Akita Pref.	56 (3)	1500	920915-A, -B, -C
7 Mt. Asahi-dake, Tazawako-machi, Akita Pref.	56 (6)	1300	920628, 920906-A, -B, -C, -D
8 Mt. Waga-dake, Kakunodate-machi, Akita Pref.	56 (1)	1400	920816
9 Mt. Nakanosawa-dake, Ota-machi, Akita Pref.	56 (1)	800	920705-A
10 Mt. Chokai-san, Yuza-machi, Yamagata Pref.	56 (14)	1700	920915, 930826-A1, -A2, 930826-B, -C, -D, -E, -F, -G, -H, -I1, -I2, -J, -K
11 Haraikawa, Yasima-machi, Akita Pref.	56 (4)	1200–1400	930807-A, -B, -C, -D
12 Mt. Kurikoma-yama, Higashinaruse-mura, Akita Pref.	56 (4)	1200	930817-A, -B, -C, -D
13 Mt. Takamatsu-dake, Yuzawa City, Akita Pref.	84 (5)	1240	930815-A, -B, 941022-1, -2, -3
14 Mt. Kamuro-yama, Ogachi-machi, Akita Pref.	84 (4)	1240	930928-A1, 950820-1, -2, -3
	85 (1)	1240	930928-A2
15 Mt. Gassan, Haguro-machi, Yamagata Pref.	56 (2)	1800	930811-A, -B
	84 (1)	1520	930811-C
16 Mt. Zao-san, Shichigashuku-machi, Miyagi Pref.	56 (5)	1520–1610	950905-1, -2, -3, -4, -5

*Cultivated at Kyoto University.

were found (Table 1 and Fig. 2), but the two cytotypes occurred at different elevations. Although Matsuura and Suto (1935) reported 2n=54 from Gassan, we did not fined any 2n=54 plants. In Kamuro-yama, Akita Pref., a hyperdodecaploid plant (2n=85) was obtained within the dodecaploid population. The hyperdodecaploid collected in this study may be an accidental aneuploid plant which was suggested to occur when the ploidy level is higher (Tateoka 1989). In conclusion, *S. albiflora* consists of octaploid (2n=56) and dodecaploid (2n=84) cytotypes.

Dodecaploid cytotype has a narrower distribution range (Fig. 2) and smaller population size than octaploid. In morphology, octaploids show wider variation than dodecaploids in form of the inflorescence, shape and size of the leaflets, and so on, and the variation range of dodecaploid seems to be included to the range of octaploid. Under cultivation at the experimental field of Tokyo Metropolitan University, dodecaploids produced inflorescences regularly and bloomed in late June to July, while octaploids have never produced inflorescences.

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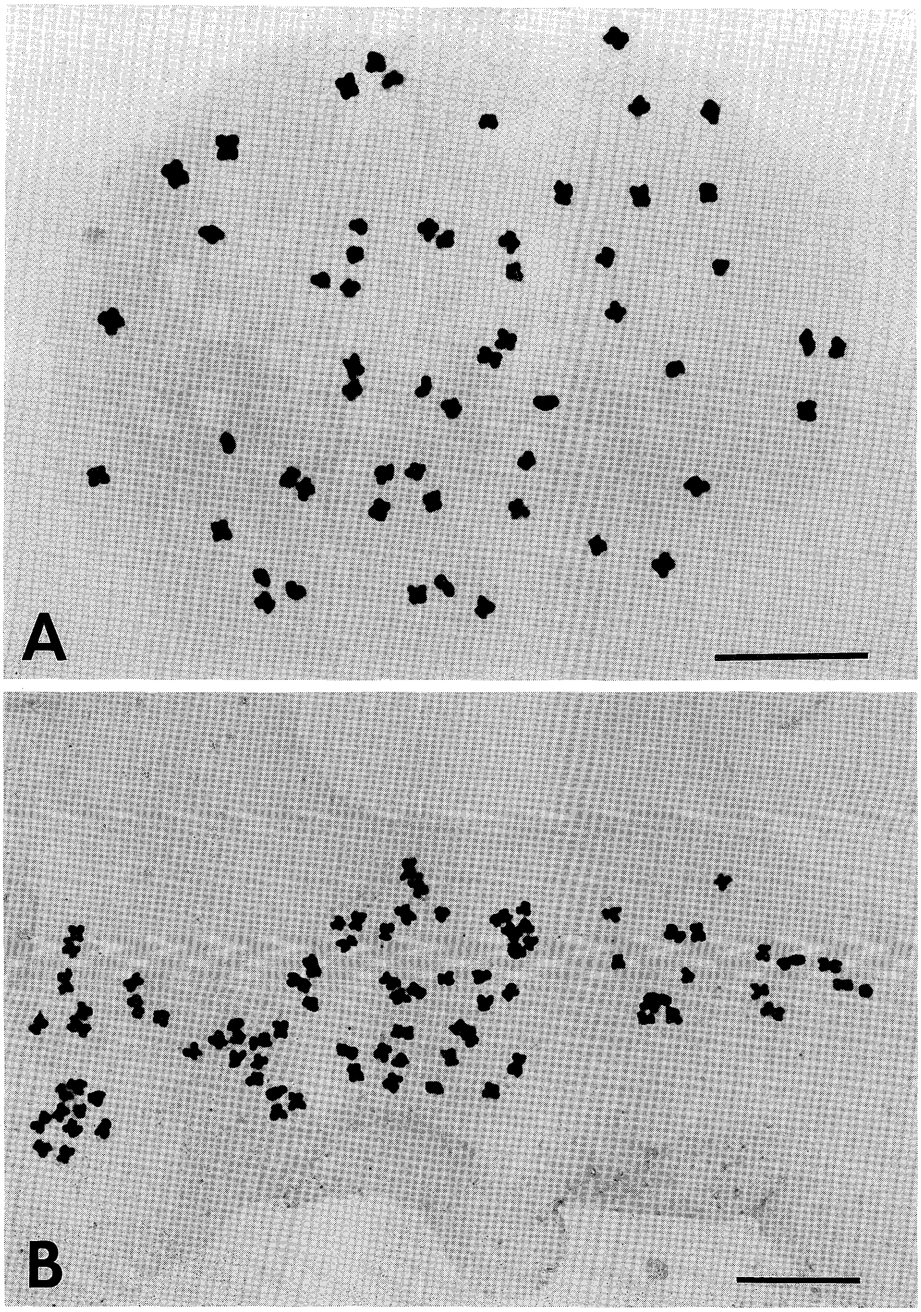

Fig. 1. Somatic metaphase chromosomes of *Sanguisorba albiflora*. A: 2n=56. B: 2n=84. Bars represent 10 μm.

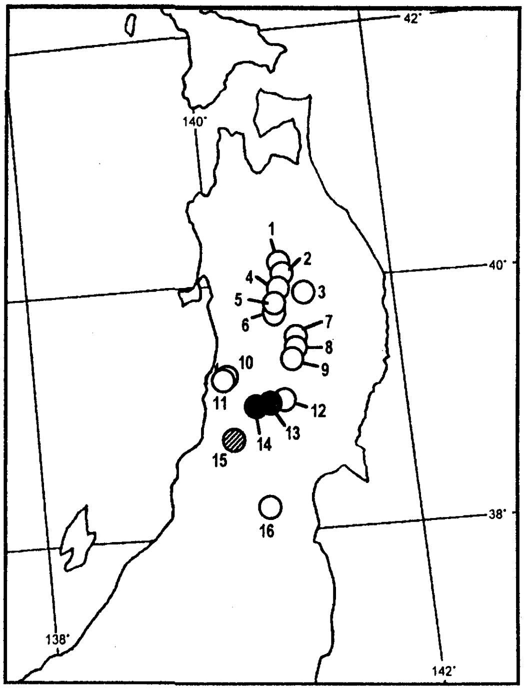

Fig. 2. Collection localities of *Sanguisorba albiflora* observed. Solid circles (●): 2n=56. Open circles (○): 2n=84. A gray circle (◍) indicates Mt. Gassan where two octaploids and a dodecaploid were obtained.

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三島美佐子[a], 岩坪美兼[b], 堀井雄治郎[c], 鳴橋直弘[b]:
シロバナトウウチソウ（バラ科）の染色体数

シロバナトウウチソウは，東北地方の亜高山帯に生える日本固有種である．これまで本種の染色体数については，2n＝56と2n＝54の報告があったが，採集地あるいは調査個体数が十分に示されていなかった．本研究では，シロバナトウウチソウの染色体数を，16集団70個体について調査した．その結果，13集団59個体の植物は2n＝56の8倍体であった．一方，高松岳，神室山(いずれも秋田県）の2集団，計9個体の植物は，2n＝84の12倍体であった．ほとんどの集団からは一方の倍数体のみが得られたが，唯一月山では，1520m地点から12倍体，1800m地点から8倍体が得られた．本研究の結果，本種は8倍体，12倍体から構成されることが明らかになった．神室山からは異数体(2n＝85）も1個体えられたが，2n＝54や2n＝85のような異数体はまれであり，偶発的に生じるものであると思われる．

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